

Regional Supervisor,
Branch of Wildlife Refuges
Regional Engineer

March 26, 1963

EE-R Lake Andes
Water Management Plan

Lake Andes NWR, South Dakota - 1963 Annual Water Management Plan

We have reviewed the subject water management plan and generally concur in the proposed plan of operation.

Based on current conditions below normal runoff may be expected. This year may be dry and conserving what water we have should be our first concern, however, with the three units above normal we will be vulnerable to higher stages this year if we have another wet year.

A close watch on pool elevations and weather conditions will be necessary especially in Owens Bay. Lowering of the Owens Bay pool should be geared to runoff potential.

John D. Umberger

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LAKE ANDES NATIONAL WILDLIFE REFUGE
Lake Andes, South Dakota

ANNUAL WATER MANAGEMENT PLAN - 1963

A. Existing water supply.

Unit	Gauge Reading	Management Level	Maximum Level	Inflow (approx.)	Outflow (approx.)
North	99.85	99.10	100.00	None	None
Center	99.84	97.60	100.00	None	None
South	99.79	97.60	100.00	500 g.p.m.	None
Owens Bay	6.30	6.30	6.50	600 g.p.m.	500 g.p.m.

The assumed 0.00 gauge reading for Owens Bay is 1135.52 m.s.l. and the assumed 100.00 gauge reading for the main lake is 1137.55 m.s.l.

See Reply To Regional Supervisor - Regular 2/28/61

Lake Andes proper is divided into three units by two dikes. Control structures in these dikes are designed to hold water in the end units supported by the larger watersheds and to pass water to the Center Unit only when the North Unit exceeds 99.10 and the South Unit exceeds 97.60. As the Center Unit exceeds 97.60, it and the South Unit become contiguous and as these exceed 99.10, the entire lake becomes contiguous. The maximum level, 100.00, is regulated by a control structure on the outlet siphon to the Missouri River.

B. 1962 Water Uses.

The attached table presents the water use information for all units during 1962.

The management level of Owens Bay was increased from 5.50 to 6.30 on April 9 after the spring run-off was complete. This increase flooded back onto shoreline exposed by increased grazing pressure and created considerable territorial space for breeding ducks. The increase also resulted in some reduction in the quantity of over-dense river bulrush which covered much of the unit.

The breeding population on Owens Bay decreased from 91 pairs in 1961 to 80 pairs in 1962. The unit offered what appeared to be improved breeding habitat and indications until early May were that breeding ducks would respond. Above average precipitation, starting in mid-May, created large numbers of potholes in the southern Coteau and, indications are that the refuge population dispersed to these newly created areas prior to the pair counts. This precludes any measurement of the effect of the increased water level in 1962.

The response of aquatic vegetation to the management of water levels on Owens Bay was to be measured by serial photography; however, the photography work was cancelled due to other commitments of the aircraft. General observations indicated that approximately one-half of the dense river bulrush stand estimated at 90 acres (one-third of the unit) in 1961 has been eliminated by the increased water levels. This area of increased open water supported excellent growths of mixed submergents including sage and floating leaf pondweeds and coontail.

^{8"} The artesian well delivered approximately 600 g.p.m., or 1,422 acre feet per year to the Owens Bay Unit.

Lake Andes proper is supplied only by run-off. Inflow from the melting of an above average snow cover in late March and April brought the North Unit to management level and spilled into the Center Unit. This unit exceeded its management level on April 3 and water spilled into the South Unit, which had increased three foot to approximately one foot below management level when run-off ceased.

A period of above average precipitation commenced in mid-May. This caused run-off beginning about June 1 which brought the South Unit to management level on June 4. Continued run-off filled the lake, and on June 16 water started flowing through the outlet to the Missouri River. This outflow reached an estimated 5 c.f.s. on June 17 and continued at that rate until July 13. On that date, a cloudburst dumped from 6 to 9 inches of rain in the watershed. This caused all units to exceed the maximum level by approximately two feet. Continued run-off equalled the outflow (estimated at 45 c.f.s.) until mid-August when the levels started to recede, and November 5 outflow ceased.

The large fluctuation in water levels and increased depth in all units resulted in a considerable decrease in aquatic vegetation. Emergents were present in the shallow bays of the North and Center Units and small sage beds were common along the shorelines. Coontail was scattered throughout the lake.

The breeding population of waterfowl decreased approximately 40 per cent from 1961 and broods observed decreased approximately 65 per cent. This decrease in use by waterfowl is probably related to the less attractive, deep water habitat and the considerable increase in off refuge habitat.

There were no problems of botulism or other biological factors in 1962.

C. 1963 Management Recommendations

It is recommended that the level of Owens Bay be decreased from

6.30 feet to 5.50 feet in mid-March or prior to the apparent run-off period. This level should provide suitable breeding territories in openings created by muskrats and on exposed shoreline.

The management of the other units will depend upon the run-off received and the evapo-transpiration from the lake. The North Unit will be held at 99.10, should the lake drop that much and then run-off be received. No other management will be possible until both the South and Center Units drop below 97.60 and then run-off be received. All water received in the South Unit will be held there.

Any water in excess of the maximum level of 100.00 will be passed to the Missouri River.

Harvey W. Miller
Harvey W. Miller F.R.R.
Wildlife Biologist

IMPOUNDMENT DATA - 1962

* Estimated data.